

9.3 DM486

9.3.1 General Information

The DM486 is a standard digital mixed module. The properties are the same as the DI486 and DO486.

The DM486 supplements the DI486/DO486 and likewise offers very high component density using standard 3.5 mm terminal blocks.

9.3.2 Order Data

Model Number	Short Description	Image
3DM486.6	2005 digital mixed module, 16 inputs 24 VDC, 1 ms, sink/source, 16 transistor outputs 24 VDC, 0.5 A, electrically isolated input and output groups. Order 2 x TB718 terminal blocks separately!	
7TB718.9	Accessory terminal block, 18-pin, screw clamp, 1.5 mm ²	
7TB718.91	Accessory terminal block, 18-pin, cage clamp, 1.5 mm ²	
7TB718:90-02	Accessory terminal block, 18-pin, 20 pieces, screw clamp, 1.5 mm ²	
7TB718:91-02	Accessory terminal block, 18-pin, 20 pieces, cage clamp, 1.5 mm ²	
Terminal blocks are not included in the delivery.		

Table 178: DM486 order data

9.3.3 Technical Data

Product ID	DM486
General Information	
C-UL-US Listed	Yes
B&R ID Code	\$63
Module Type	B&R 2005 I/O module
Can be Installed on Main Rack Expansion Rack	Yes Yes
Power Consumption Internal 5 V 24 V Total External 24 VDC (DO)	Max. 1.2 W --- Max. 1.2 W Max. 2.2 W
Static Characteristics for Inputs	
Number of Inputs	16
Design	IEC1131 - Type 1
Electrical Isolation Input - PLC Input Groups – Output Groups Input - Input	Yes Yes No
Wiring	Sink or source
Diagnosis Status Voltage monitoring Input Monitoring	Supply voltage <18 VDC Input State
Maximum Peak Voltage	500 V for 50 μ s max. every 100 ms
Rated Voltage Nominal Maximum	+24 VDC +30 VDC
Input Current at Nominal Voltage	Approx. 4 mA
Input Resistance	6 k Ω
Switching Threshold LOW Range Switching range HIGH Range	< 5 V 5 to 15 V > 15 V
Isolation Voltage between Input and Bus	$\pm$ 50 V
Additional Characteristics for Inputs	
Status Display	16 green Input LEDs 1 yellow DCOK LED
Dynamic Characteristics for Inputs	
Input Delay Typical Maximum	0.5 ms 1 ms

Table 179: DM486 technical data

Product ID	DM486	
Static Characteristics for Outputs		
Number of Outputs	16	
Design	FET positive switching	
Electrical Isolation		
Output - PLC	Yes	
Output Groups – Input Groups	Yes	
Output - Output	No	
Diagnosis Status		
Voltage monitoring	Supply voltage <18 VDC	
Output Monitoring	Output Status	
Switching Voltage		
Minimum	18 VDC	
Nominal	24 VDC	
Maximum	30 VDC	
Continuous Current per	Rev. <E0	Rev. ≥E0
Output	Max. 0.5 A	Max. 0.5 A
Module	Max. 6 A	Max. 8 A
To increase the output current, outputs can be switched in parallel.		
Leakage Current when Switched Off	<120 µA	
Residual Voltage	<200 mV @ 0.5 A	
Short Circuit - Peak Current	<13 A	
Switching On after Overload Cutoff	Automatically within seconds depending on the module temperature	
Protection	Thermal cutoff for over-current and short circuit Integrated protection for switching inductances Reverse Polarity Protection	
Additional Characteristics for Outputs		
Status Display	16 yellow output LEDs 1 yellow DCOK LED 1 red ERROR LED	
Dynamic Characteristics for Outputs		
Switching Delay	Rev. <E0	Rev. ≥E0
Log. 0 - Log. 1	< 475 µs	< 225 µs
Log. 1 - Log. 0	< 550 µs	< 330 µs
Switching Frequency	Max. 100 Hz	
Resistive Load	See Section 9.3.11 "Switching Inductive Loads", on page 310 (with 90% duty cycle)	
Inductive Load		
Braking Voltage when Switching Off Inductive Loads	50 VDC	
Mechanical Characteristics		
Dimensions	B&R 2005 single-width	

Table 179: DM486 technical data (cont.)

9.3.4 Status LEDs

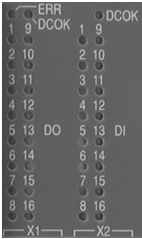
Image	LED	Description
	ERR	The ERR LED is an accumulative indication for all high-side drivers. The LED is lit if an output which is being controlled has a short circuit or over-temperature or if the module voltage sinks below 18 VDC.
	DCOK	The DCOK LED is controlled by the respective supply and is lit if the supply voltage is over +18 VDC.
	1 - 16, yellow	Control status of the corresponding digital output.
	1 - 16, green	Input state of the corresponding digital inputs.

Table 180: DM486 Status LEDs

9.3.5 Connection Elements

Two 18-pin terminal blocks are located next to each other in the lower part of the housing so that all signals can be connected using terminal blocks.

The TB718 terminal blocks are available with screw and cage clamps.

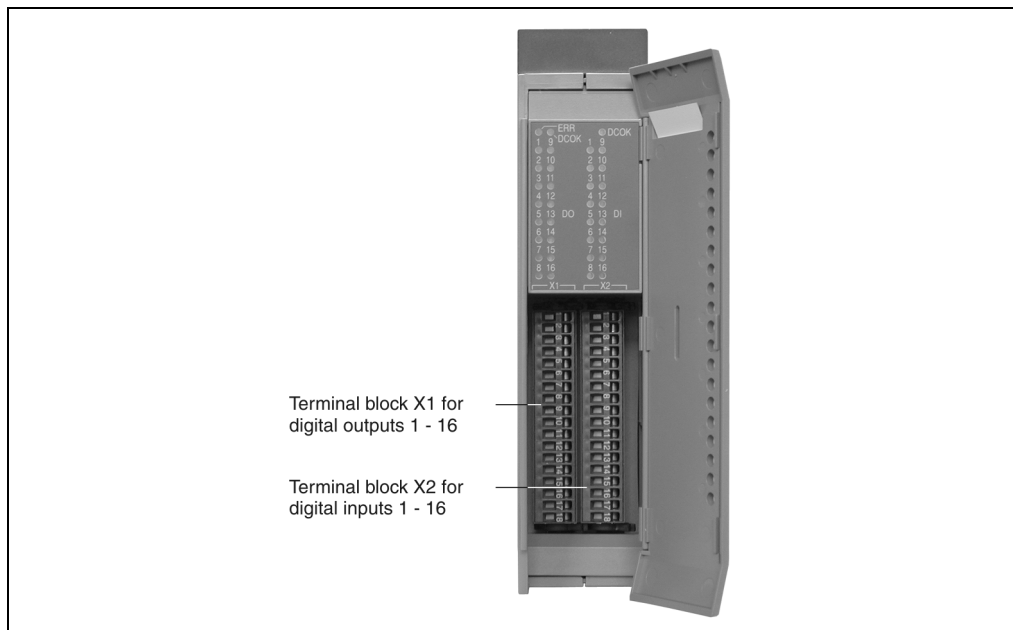


Figure 116: DM486 connection elements

9.3.6 Pin Assignments

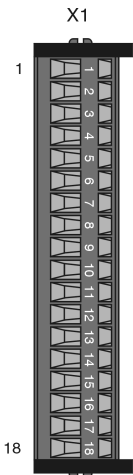
Left 18-pin Terminal Block	Connection	Assignment
 X1 1 18 TB718	1	Output 1
	2	Output 2
	3	Output 3
	4	Output 4
	5	Output 5
	6	Output 6
	7	Output 7
	8	Output 8
	9	Output 9
	10	Output 10
	11	Output 11
	12	Output 12
	13	Output 13
	14	Output 14
	15	Output 15
	16	Output 16
	17	+24 VDC
	18	GND

Table 181: DM486 pin assignments for terminal block X1

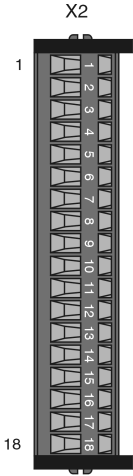
Right 18-pin Terminal Block	Connection	Assignment
 X2 1 18 TB718	1	Input 1
	2	Input 2
	3	Input 3
	4	Input 4
	5	Input 5
	6	Input 6
	7	Input 7
	8	Input 8
	9	Input 9
	10	Input 10
	11	Input 11
	12	Input 12
	13	Input 13
	14	Input 14
	15	Input 15
	16	Input 16
	17	COMs (+24 VDC in sink operation)
	18	COM (GND in sink operation)

Table 182: DM486 pin assignments for terminal block X2

9.3.7 Connection Example

Digital Outputs

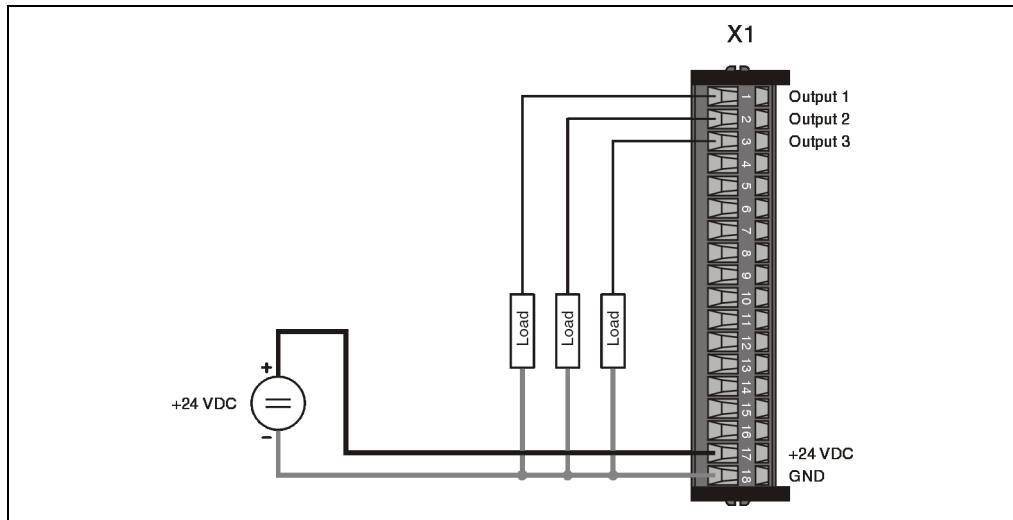


Figure 117: DM486 digital output connection example

Digital Inputs

Sink Connection

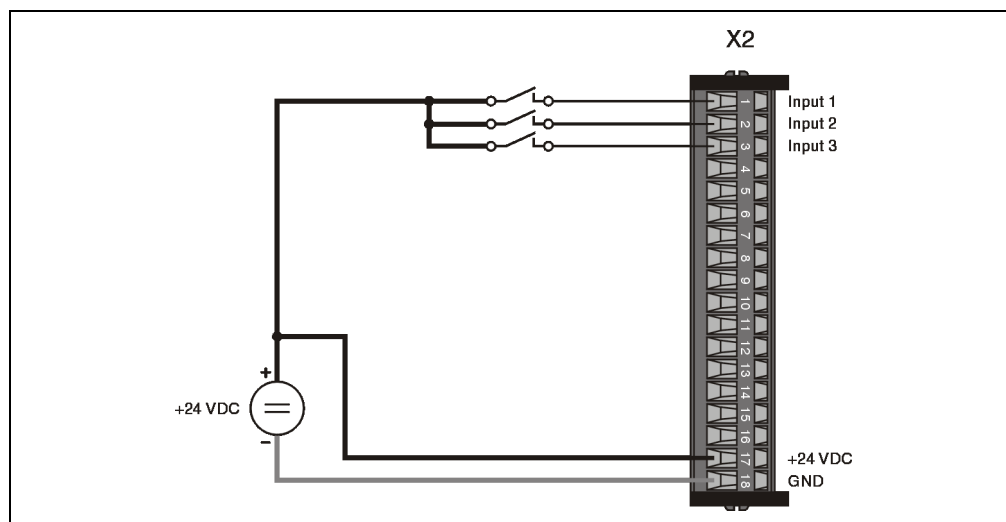


Figure 118: DM486 digital input connection examples (sink)

Source Connection

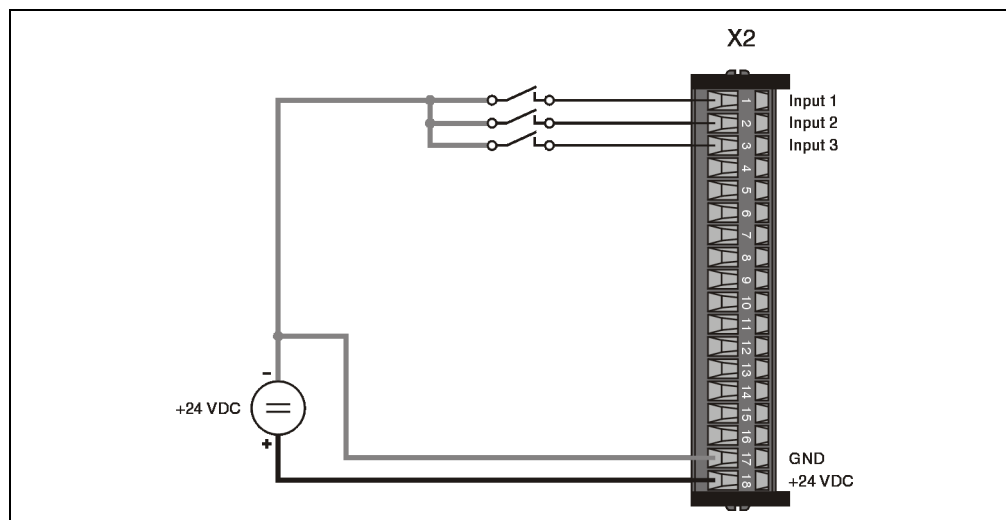


Figure 119: DM486 digital inputs connection examples (source)

9.3.8 Input Circuit Diagram

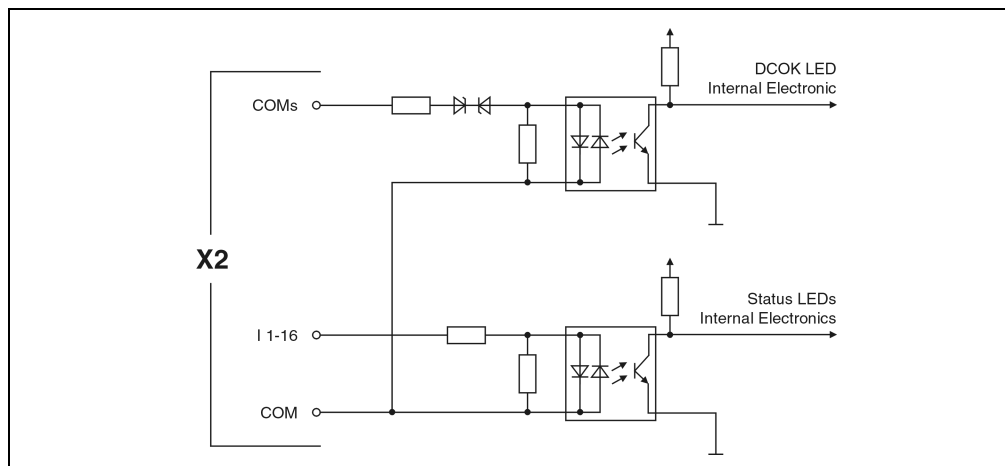


Figure 120: DM486 input circuit diagram

9.3.9 Output Circuit Diagram

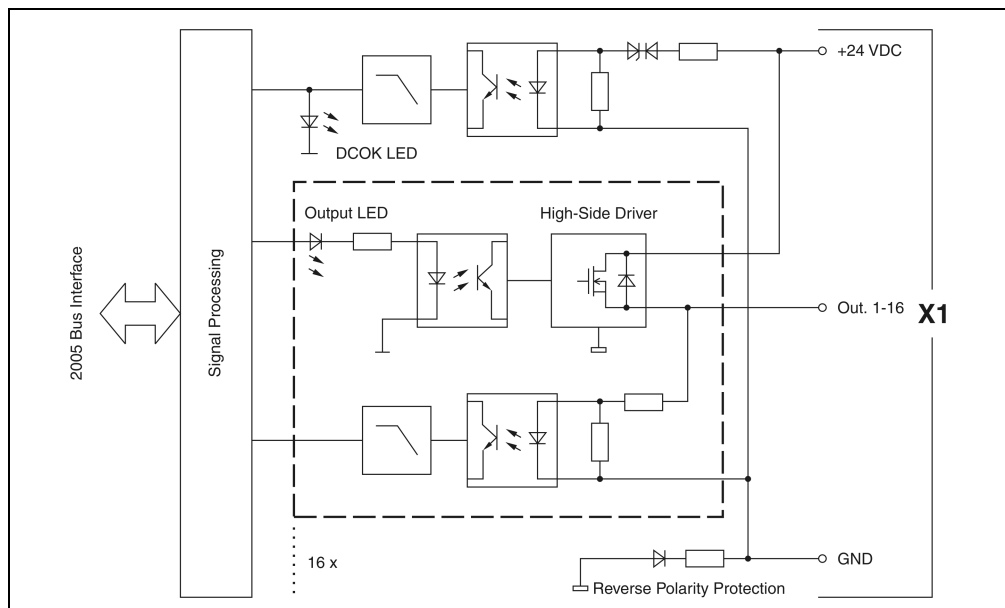


Figure 121: DM486 output circuit diagram

9.3.10 Output Monitoring

The output states are compared to the set values on the module. The output driver is used to control desired states. Output monitoring is only active if the supply voltage for the group is in the valid range.

The status of each individual channel can be read using a register. Additionally, an accumulative bit for output monitoring is created. The status of the supply voltage can also be read.

9.3.11 Switching Inductive Loads

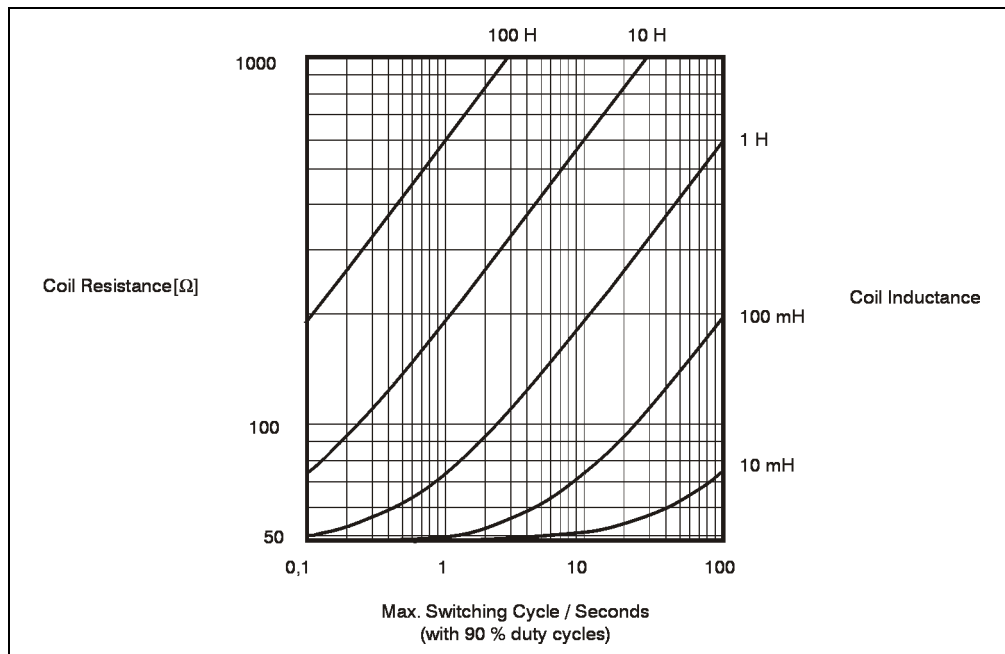


Figure 122: DM486 switching inductive loads

9.3.12 Variable Declarations

The variable declaration is made in B&R Automation Studio™:

Function	Variable Declarations				
	Scope	Data Type	Length	Module Type	Chan.
Single digital output (channel x)	tc_global	BOOL	1	Digit. Out	1 ... 16
Single digital input (Channel x)	tc_global	BOOL	1	Digit. In	1 ... 16
Single output status (channel x)	tc_global	BOOL	1	Digit. In	65 ... 80
Status register	tc_global	USINT	1	Status In	0

Table 183: DM486 variable declaration

Status Register

Status Register	Bit	Description
	7	DCOK_DI - Supply voltage for inputs in the valid range
	6	DCOK_DO - Supply voltage for outputs in the valid range
	5	x
	4	ERR_2 - Error occurred in output group
	3	x
	2	x
	1	x
	0	x
7 x x x x x x 0		

ERR 0.....Outputs working correctly

1.....A controlled output has short circuited or has an over-temperature status or the module voltage has dropped below 18 VDC

DCOK_DO 0..... No supply voltage or supply voltage too low for outputs

1..... Supply voltage for outputs in the valid range

DCOK_DI 0..... No supply voltage or supply voltage too low for inputs

1..... Supply voltage for inputs in the valid range